IV. REMARKS

The Examiner objects to the title of the invention and suggests changes (Office Action, dated June 13, 2008, at 2, lines 2-4). Applicants previously amended the Title of the Invention by Preliminary Amendment (A), filed January 31, 2006, at 2, in accordance with the Examiner's suggestion. Therefore, no further amendment to the Title of the Invention is believed to be necessary at this time.

The specification has been amended to address formatting problems, grammar issues, and to add superscripts that were omitted from the English translation of the Japanese International Application PCT/JP2004/01078 filed July 28, 2004. A substitute specification is provided that also incorporates the International and Japanese priority applications by reference in accordance with Preliminary Amendment (A) as well as amendment to the Title.

In view of the formatting errors and inadvertent omissions in the English specification originally filed with the present application, Applicants file herewith a certified English translation of International Application PCT/JP2004/01078 and a certified English translation of Japanese Patent Application No. 2003-284527, which is the priority document to which International Application PCT/JP2004/01078 claims priority. The errors made in the originally filed English translation were clerical errors made without deceptive intent.

The Abstract of the Disclosure has also been amended to comply with 37 C.F.R. § 1.72.

Claims 2-4 and 8 have been cancelled without prejudice, and claims 1 and 5-7 have been amended. Specifically, independent claim 1 has been amended to improve grammar and clarity, and to incorporate subject matter from previous claims 2-4. Claim 5, which depends upon claim 1, has been amended to improve grammar and clarity, and in accordance with the amendment of claim 1.

Independent claim 6 has been amended to improve grammar and clarity, and to incorporate subject matter from previous claim 1. Claim 7, which depends upon claim 6, has been amended to improve grammar and clarity, and in accordance with the amendment of claim 6.

The present amendment adds no new matter to the above-captioned application.

A. The Invention

The present invention pertains broadly to a gas supply facility for a chamber, and to a method for internal pressure control of a chamber, such as may be utilized with semiconductor manufacturing facilities, and the like. In accordance with an embodiment of the present invention, a gas supply facility is provided that includes features recited by independent claim 1. In accordance with another embodiment of the present invention, a method for internal pressure control of a chamber is provided that includes steps recited by independent claim 6. Various other embodiments, in accordance with the present invention, are recited by the dependent claims.

An advantage provided by the various independent and dependent embodiments of the present invention is that by employing a first pressure type flow controller controlling a small flow quantity and a second pressure type flow controller controlling a large flow quantity accurate flow rate control of a gas over a wide flow rate range is achieved.

B. The Rejections

Claims 1 and 3 stand rejected under 35 U.S.C. § 112, second paragraph, as indefinite.

Claims 6 and 7 stand rejected as anticipated by Pfeiffer et al. (PCT Publication WO 01/96972, hereafter the "Pfeiffer Document").

Claims 1-3 stand rejected under 35 U.S.C. §103(a) as unpatentable over Lull et al. (U.S. Patent Application Publication 2002/0179148, hereafter the "Lull Publication") in view of Ohmi et al. (U.S. Pat. No. 6,422,264, hereafter the "Ohmi'264 Patent"), and further in view of Ohmi et al. (U.S. Pat. No. 6,178,995, hereafter the "Ohmi'995 Patent"). Claims 4 and 5 stand rejected under 35 U.S.C. 103(a) as being unpatentable over the Lull Publication in view of the Ohmi'264 Patent, and the Ohmi'995 Patent, as applied to claim 1 above, and further in view of Carter (U.S. Pat. No. 5,875,817, hereafter the "Carter Patent"). Claim 8 stands rejected under 35 U.S.C. 103(a) as unpatentable over the Pfeiffer Publication as applied to claim 6 above, in view of the Ohmi'995 Patent, and further in view of the Lull Publication.

For all of the following reasons, Applicants respectfully traverse the Examiner's rejections and request reconsideration of the above-captioned patent application.

C. Applicants' Arguments

In view of the present amendment, claims 1 and 5-7 are in compliance with 35 U.S.C. § 112. Specifically, the Examiner contends that the it is unclear how the flow rate through one controller could be 10% of the overall flow rate while the flow rate through another controller could be 100% of the overall flow rate (Office Action, dated June 13, 2008, at 3, lines 4-8). Claim 1 now recites

> "the first pressure type flow controller controls the small flow quantity gas flow rate range up to 10% of the maximum flow rate supplied to the chamber, while the second pressure type flow controller controls the large flow quantity gas flow rate range of about 10-100% of the maximum flow rate supplied to the chamber."

A person of ordinary skill in the art would understand this passage to mean that the first pressure type flow controller controls small flow quantity that is defined as up to 10% of the maximum flow rate, and that the second pressure type flow controller controls large flow

quantity that is defined as about 10% to 100% of the remaining maximum flow rate above 10 %. For a claim to comply with 35 U.S.C. § 112, second paragraph, it must (1) set forth what the Applicant regards as the invention and (2) it must do so with sufficient particularity and distinctness so as to be sufficiently "definite." Solomon v. Kimberly-Clark Corp., 55 U.S.P.Q.2d 1279, 1282 (Fed. Cir. 2000). During patent prosecution, definiteness of a claim may be analyzed by consideration of evidence beyond the patent specification, including the inventor's statements to the Patent and Trademark Office. Id. In view of the present amendment, and in view of the inventors' statements made above, claims 1 and 5-7 are in compliance with 35 U.S.C. § 112.

i. The Section 102 Rejection

Anticipation under 35 U.S.C. § 102 requires showing the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim. Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick, 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984). In this case, the Examiner has failed to establish a prima facie case of anticipation against Applicants' claimed invention because the Pfeiffer Document does not teach each and every limitation of independent claims 1 and 6.

ii. The Pfeiffer Document

The Pfeiffer Document discloses "methods and apparatus for maintaining a pressure within an environmentally controlled chamber," as shown in Figure 2, wherein a system (1) including a chamber (102), a variable speed vacuum pump (204) coupled to the chamber, and a pressure controller (202) coupled to the chamber, wherein the pressure controller (202) compares a set point pressure with a pressure measurement for the chamber and adjusts a flow of gas through the pressure controller based on a difference between the pressure

measurement and the set point pressure (See Abstract of the Pfeiffer Document). The system, according to Pfeiffer, includes a pressure measurement device coupled (126) to the chamber and to the pressure controller, and a main controller coupled to the variable speed vacuum pump, the pressure controller and the pressure measurement device, wherein the pressure measurement device measures a pressure within the chamber and provides a pressure measurement to the pressure controller and the main controller, and the main controller adjusts a speed of the variable speed vacuum pump (204) and provides the set point pressure to the pressure controller (See Abstract of the Pfeiffer Document).

However, the Pfeiffer Document does not teach, or suggest, "a first pressure type flow controller controlling a small flow quantity corresponding to 10% of a maximum flow rate of the gas supply facility to the chamber" and "a second pressure type flow controller controlling a large flow quantity corresponding to 90% of the maximum flow rate of the gas supply facility to the chamber" as recited by independent claims 1 and 6. As admitted by the Examiner (Office Action, dated June 13, 2008, at 9, line 15, to 10, line 4), the Pfeiffer Document does not teach, or suggest, "the first pressure type flow controller and the second pressure type flow controller each comprises...an orifice;...a pressure detector provided on an upstream side of the orifice;...a control valve provided on an upstream side of the pressure detector; and...a computation control part that computes a first gas flow rate Qc of gas passing through the orifice using pressure P1 detected by the pressure detector and using formula Qc = KP1, where K is constant" as recited by independent claims 1 and 6. The Pfeiffer Document also does not teach, or suggest, "the first pressure type flow controller controls the small flow quantity gas flow rate range up to 10% of the maximum flow rate supplied to the chamber, while the second pressure type flow controller controls the large flow quantity gas flow rate range of about 10-100% of the maximum flow rate supplied to the chamber" as recited by independent claim 1.

For all of the above reasons, the Examiner has failed to demonstrate that the Pfeiffer Document is sufficient to establish a prima facie case of anticipation against claims 1 and 5-7 of the above-captioned application.

iii. The Section 103 Rejections

A prima facie case of obviousness requires a showing that the scope and content of the prior art teaches each and every element of the claimed invention, and that the prior art provides some teaching, suggestion or motivation, or other legitimate reason, for combining the references in the manner claimed. KSR International Co. v. Teleflex Inc., 127 S.Ct. 1727, 1739-41 (2007); In re Oetiker, 24 U.S.P.Q.2d 1443 (Fed. Cir. 1992). In this case, the Examiner has failed to establish a prima facie case of obviousness against claims 1 and 5-7 of the above-captioned application because the Pfeiffer Document, the Lull Publication, the Ohmi'264 Patent, the Ohmi'995 Patent, and the Carter Patent, either alone or in combination, fail to teach, or suggest, each and every element of the claimed invention.

iv. The Pfeiffer Document

The disclosure of the Pfeiffer Document is discussed above.

v. The Lull Publication

The Lull Publication discloses a "method and apparatus for providing a determined ratio of process fluids," wherein a fluid flow control system includes a fluid inlet to receive a flow of process fluid and a plurality of fluid outlets, wherein the plurality of fluid outlets include a first fluid outlet and at least one second fluid outlet (See Abstract of the Lull Publication). The Lull Publication further discloses that the first fluid outlet provides a first predetermined portion of the flow of process fluid, and the at least one second fluid outlet

provides the remaining portion of the flow of process fluid (See Abstract of the Lull Publication). The Lull Publication also discloses an embodiment wherein the control system includes a pressure transducer, first and second multipliers, and first and second flow controllers, wherein the first multiplier multiplies a pressure signal received from the pressure transducer by a first setpoint to control a first flow controller that provides the first predetermined portion of the flow of process fluid and the second multiplier multiplies the pressure signal by a second setpoint to control a second flow controller that provides the remaining portion (See Abstract of the Lull Publication).

A person of ordinary skill in the art would instantly realize that the Lull Publication discloses a flow volume of $Q*\alpha*s$ that is a split-flow to one MFC(A) whereas the flow volume of $Q*\alpha*(1-s)$ is a split-flow to another MFC(B), wherein split-flow is changed by changing the aggregate setpoint α and by changing the split ratio s when Q is the gas flow quantity supplied to chamber (160), (See Lull Publication, ¶¶ [0035]-[0037], and Figures 1 and 2). However, the Lull Publication does not teach, or suggest, that the flow rate range of one MFC is 0.1 Q, the split ratio is made to be 1, or only one MFC is used to supply gas to chamber (160) when the aggregate set point α is in the range of 0.001 to 0.1, for example. Therefore, as conceded by the Examiner (Office Action, dated June 13, 2008, at 7, lines 15-16, and at 8, lines 1-3), the Lull Publication does not teach, or suggest, "a first pressure type flow controller controlling a small flow quantity corresponding to 10% of a maximum flow rate of the gas supply facility to the chamber" and "a second pressure type flow controller controlling a large flow quantity corresponding to 90% of the maximum flow rate of the gas supply facility to the chamber" as recited by independent claims 1 and 6.

As also conceded by the Examiner (Office Action, dated June 13, 2008, at 6, lines 12-134), the Lull Publication also does not teach, or suggest, switching on a second flow rate controller when flow exceeds a predetermined limit. Therefore, the Lull Publication also

does not teach, or suggest, "the first pressure type flow controller is initially operated to control small flow quantity and when flow rate reaches 10% of the maximum flow rate the second pressure type flow controller is switched into operation" as recited by independent claim 1.

In view of the above facts, a person of ordinary skill in the art would also realize that the system and method disclosed by the Lull Publication cannot achieve the accurate flow control over a wide flow rate range of 0.1-100% of the maximum flow rate while achieving improved flow rate accuracy in the small flow rate range (i.e., 10% or less of the maximum flow rate) as does the present invention. In particular, the Lull Publication does not teach, or suggest, "the first pressure type flow controller controls the small flow quantity gas flow rate range up to 10% of the maximum flow rate supplied to the chamber, while the second pressure type flow controller controls the large flow quantity gas flow rate range of about 10-100% of the maximum flow rate supplied to the chamber" as recited by independent claim 1.

As admitted by the Examiner (Office Action, dated June 13, 2008, at 6, line 13), the Lull Publication does not teach, or suggest, "a chamber exhausted by a vacuum pump" as recited by claim 1.

vi. The Ohmi'264 Patent

The Ohmi'264 Patent discloses a "parallel divided flow-type fluid supply apparatus, and fluid-switchable pressure-type flow control method and fluid-switchable pressure-type flow control system for the same fluid supply apparatus," as shown in Figure 1, wherein a fluid supply apparatus is provided with a plurality of flow lines branching out from one pressure regulator with the flow lines arranged in parallel and constructed so that opening or closing one flow passage will have no transient effect on the steady flow of the other flow passages (See Abstract of the Ohmi'264 Patent). Each flow passage is provided with a time

delay-type mass flow controller MFC so that when one closed fluid passage is opened, the mass flow controller on that flow passage reaches a set flow rate Qs in a specific delay time Δt from the starting point (See Abstract of the Ohmi'264 Patent).

vii. The Ohmi'995 Patent

The Ohmi'995 Patent discloses a "fluid supply apparatus" as shown in Figure 1, which includes parallel flow passages connected at their downstream side, each parallel passage including a pressure flow controller (C) for regulating the flow of fluid and a fluid changeover valve (D) for opening and closing the passage on the downstream side of the pressure flow controller, and a fluid feeding control unit (B) controls the pressure flow controllers and changeover valves so that when a changeover valve is closed a control valve (1) upstream of the changeover valve is also closed to prevent a pressure buildup at the changeover valve (See Abstract of the Ohmi'995 Patent). In addition to the control valve (1), the Ohmi'995 Patent discloses that each pressure flow controller includes an orifice (5) downstream from the control valve, a pressure detector (3) for sensing pressure P_1 in the passage at a point between the control valve and the orifice, and a calculation control unit (6) for producing a control signal Qy for controlling the drive (2) for the control valve, wherein the calculation control unit first calculates a flow rate signal $Qc=KP_1$, where K is a constant and P_1 is the pressure sensed by the pressure detector (See Abstract of the Ohmi-995 Patent). The calculation control unit then calculates Qy as the difference between a set point or flow rate specifying signal Qs and the calculated value Qc; thus, according to the Ohmi'995 Patent, the flow rate on the downstream side of the orifice is controlled by regulating the pressure P_1 on the upstream side of the orifice via the control valve (See Abstract of the Ohmi'995 Patent).

viii. The Carter Patent

The Carter Patent discloses a "digital gas metering system using tri-stable and bi-stable operations," wherein the digital gas metering system includes inlet and outlet manifolds, a plurality of conduits (252) each extending between the inlet manifold (254) and the outlet manifold (256), and a solenoid-operated valve (250) in each conduit (252), (See Carter Patent, Figure 5, and col. 20, lines 7-20). At least one of the valves is a tri-stable valve, and each tri-stable valve has a highest flow setting, a lowest flow setting, and an intermediate flow setting (See Abstract of the Carter Patent).

As would be understood by a person of ordinary skill in the art, the Carter Patent discloses regulating an orifice open area by selection of opening or closing a plurality of solenoids connected in parallel so that flow rate of a metered gas outlet is continuously adjusted. On the other hand, claim 5 of the above-captioned application recites

> "a rising rate setting mechanism operably connected to remit second control signals to the first pressure type flow controller and the second pressure type flow controller so as to control a large flow range, and said second pressure type flow controller controlling the large flow quantity supplies the set flow rate of gas after a specified lapse of time following remittance of the second control signals."

As would be instantly appreciated by a person of ordinary skill in the art, the subject matter recited by claim 5 is substantially different from the subject matter disclosed by the Carter Patent. According to claim 5, by increasing signals to open the second pressure type flow controller for the large flow quantity to a set value in a manner that takes a specified lapse of time, the speed of opening of the second pressure type flow controller is adjusted. This mechanism is substantially different from that disclosed by the Carter Patent.

In sum, the Carter Patent does not teach, or suggest, the subject matter of claim 5.

ix. Summary of the Disclosures

Neither the Pfeiffer Document, the Lull Publication, the Ohmi'264 Patent, the Ohmi'995 Patent, nor Carter Patent, alone or in combination, teach or suggest, "a first pressure type flow controller controlling a small flow quantity corresponding to 10% of a maximum flow rate of the gas supply facility to the chamber" and "a second pressure type flow controller controlling a large flow quantity corresponding to 90% of the maximum flow rate of the gas supply facility to the chamber" as recited by independent claims 1 and 6. Furthermore, the combination of the Pfeiffer Document, the Lull Publication, the Ohmi'264 Patent, the Ohmi'995 Patent, and Carter Patent, does not teach, or suggest, "the first pressure type flow controller is initially operated to control small flow quantity and when flow rate reaches 10% of the maximum flow rate the second pressure type flow controller is switched into operation" and "the first pressure type flow controller controls the small flow quantity gas flow rate range up to 10% of the maximum flow rate supplied to the chamber, while the second pressure type flow controller controls the large flow quantity gas flow rate range of about 10-100% of the maximum flow rate supplied to the chamber" as recited by independent claim 1.

Furthermore, **the combination of the Pfeiffer Document, the Lull Publication, the Ohmi'264 Patent, the Ohmi'995 Patent, and Carter Patent, does not teach, or suggest, the subject matter of claim 5**.

For all of the above reasons, the Examiner has failed to establish a prima facie case of obviousness against claims 1 and 5-7 of the above-captioned application.

x. No Legitimate Reason to Combine Disclosures

A proper rejection under Section 103 also requires showing (1) that a person of ordinary skill in the art would have had a legitimate reason to attempt to make the composition

or device, or to carry out the claimed process, and (2) that the person of ordinary skill in the art would have had a reasonable expectation of success in doing so. PharmaStem Therapeutics, Inc. v. ViaCell, Inc., 491 F.3d 1342, 1360 (Fed. Cir. 2007). In this case, the Examiner has failed to establish a legitimate reason to make Applicants' claimed device, and to carry out Applicants' claimed process, for the following reasons.

In order to allege a prima facie case of obviousness against Applicants claimed invention, as recited by independent claims 1 and 6, the Examiner would have to combine four or five disclosures (i.e., the Pfeiffer Document, the Lull Publication, the Ohmi'264 Patent, the Ohmi'995 Patent, and Carter Patent). As conceded by the Examiner (Office Action, dated June 13, 2008, at 7, lines 15, to 8, line 3), the combination of the four or five disclosures of record would not teach, or suggest, the particular limitations of "a small flow quantity corresponding to10% of a maximum flow rate of the gas supply facility to the chamber," and "a large flow quantity corresponding to 90% of the maximum flow rate of the gas supply facility to the chamber" and "the first pressure type flow controller is initially operated to control small flow quantity and when flow rate reaches 10% of the maximum flow rate the second pressure type flow controller is switched into operation" as recited by claim 1.

The Federal Circuit has held that individual references cannot be employed as a mosaic to recreate a facsimile of the claimed invention. Northern Telecom, Inc. v. Datapoint Corporation, 15 U.S.P.Q.2d 1321, 1323 (Fed. Cir. 1990). In this case, the combination of the Pfeiffer Document, the Lull Publication, the Ohmi'264 Patent, the Ohmi'995 Patent, and Carter Patent fails to create an perfect facsimile of the claimed invention. Applicants contend that the deficiencies in the combination of so many different references cannot reasonably be remedied by an optimization argument because it would amount to improper hindsight reconstruction.

For all of the above reasons, the Examiner has failed to establish a prima facie case of obviousness against claims 1 and 5-7 of the above-captioned application.

xi. No Reasonable Expectation of Success of Arriving at Applicants' Claimed Invention if Four to Five Disclosures were Combined

A proper rejection under Section 103 requires showing that the person of ordinary skill in the art would have had a reasonable expectation of success in making the claimed invention if the combination of prior art disclosure was made. PharmaStem Therapeutics, Inc. v. ViaCell, Inc., 491 F.3d 1342, 1360 (Fed. Cir. 2007). In this case, assuming *arguendo* that the Examiner has established a legitimate reason to combine four or five of the disclosures, namely the Pfeiffer Document, the Lull Publication, the Ohmi'264 Patent, the Ohmi'995 Patent, and Carter Patent (which is not a valid assumption), a person of ordinary skill in the art would still fall short of Applicants' claimed invention as conceded by the Examiner (Office Action, dated June 13, 2008, at 7, lines 15, to 8, line 3). A person of ordinary skill in the art would not find any guidance from the disclosures of the Pfeiffer Document, the Lull Publication, the Ohmi'264 Patent, the Ohmi'995 Patent, and Carter Patent to select the "small flow quantity" and the "large flow quantity" of Applicants' claimed invention. Therefore, a person of ordinary skill in the art would not have had a reasonable expectation of success of arriving at Applicants' claimed invention by combining the four or five disclosures asserted by the Examiner.

For all of the above reasons, the Examiner has failed to establish a prima facie case of obviousness against claims 1 and 5-7 of the above-captioned application.

V. CONCLUSION

In view of the present amendment, claims 1 and 5-7 are in compliance with 35 U.S.C. § 112. Furthermore, the Examiner has failed to establish a prima facie case of anticipation against claims 1 and 5-7 because the Pfeiffer Document fails to teach, or suggest, every element of the claimed invention as conceded by the Examiner. The Examiner has also failed to establish a prima facie case of obviousness against claims 1 and 5-7 because the combination of the Pfeiffer Document, the Lull Publication, the Ohmi'264 Patent, the Ohmi'995 Patent, and Carter Patent fails to teach each and every limitation of the claimed invention, and/or the Examiner has failed to establish a legitimate reason to combine so many references to make an imperfect facsimile of the invention, and/or the Examiner has failed to establish that a person of ordinary skill in the art would have had a reasonable expectation of success of arriving at Applicants' claimed invention even if the combination of the Pfeiffer Document, the Lull Publication, the Ohmi'264 Patent, the Ohmi'995 Patent, and Carter Patent were made.

For all of the above reasons, claims 1 and 5-7 are in condition for allowance and a prompt notice of allowance is earnestly solicited.

The below-signed attorney for Applicants welcomes any questions.

Respectfully submitted,

GRIFFIN & SZIPL, P.C.

Joerg-Uwe Szipl
Registration No. 31,799

GRIFFIN & SZIPL, P.C.
Suite PH-1
2300 Ninth Street, South
Arlington, VA 22204
Telephone: (703) 979-5700
Facsimile: (703) 979-7429
Email: GandS@szipl.com
Customer No.: 24203